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ABSTRACT

In recent years, patients have been increasingly seeking and using Internet Health Information (IHI) to become more active in managing their own health in a partnership with their physicians. This trend has both positive and negative effects on the interactions and trust between the patient and physician. This study will examine the impact of patients' use of IHI on various elements that characterize the interactions between a patient and her/his physician through the lens of Principal-Agent Theory. Specifically information asymmetry between the patient and physician and its relationships with the patient's trust in and use of IHI, the patient's trust in their physician and his/her compliance with the physician's advice is examined. We outline a survey-based study to empirically validate the proposed theoretical model using structural equation modeling techniques.

Keywords

Trust, Agency Theory, Internet Health Information, Information Asymmetry, Compliance.

INTRODUCTION

The patient-physician relationship has been cited as the second most important relationship a person has, next to their family relationships (Erdem and Harrison-Walker, 2006). However, as the use of the Internet as a source for health related information becomes more commonplace, interactions and trust between the patient and physician can become strained. Patient use of the Internet in gathering health information is growing and has become commonplace. The PEW Internet and American Life Project reports 80% of American Internet users have searched for some type of IHI and approximately 8 million people search for IHI on a typical day (Fox, 2006). As patients interact more with IHI, their interactions with physicians are changing.

Unfortunately to date no empirical models have been developed and validated that examine patient trust in their physician where IHI is widely available and used by patients. In fact, little research (quantitative or qualitative) on the impact of IHI on Physician-Patient Interactions (PPI) has been completed (Erdem and Harrison-Walker, 2006). While the trust element between the patient and IHI has been empirically modeled and validated (Bliemel and Hassanein, 2007; Corritore, Wiedenbeck, Kracher and Marble, 2007), the trust relationship between the patient and physician where patient use of IHI is present has not. This study will examine these elements through the lens of Principal-Agent Theory, specifically information asymmetry between the patient and physician and its relationships with the patient's trust in and use of IHI, the patient's trust in their physician and his/her compliance with physician advice. While previous studies have looked at factors that influence compliance (Hausman, 2004; Zolnierek and DiMatteo, 2009), none have looked at how patients use of and trust in IHI impacts trust in their physicians and compliance with physician advice.

The remainder of this research in progress paper is organized as follows: the study context and theoretical background is presented followed by the proposed research model. The research methodology is outlined and finally potential contributions of this research to academics, practitioners and society as well as limitations of this research are noted.

CONTEXT AND THEORETICAL BACKGROUND

Compliance

The term compliance is generally regarded as the most common way to describe a patient following his/her physician's treatment instructions (Horne, Weinman, Barber, Elliott, Morgan and Cribb, 2005). Compliance is very important to study as previous research has shown that non-compliance averages 25% to 50% (Zolnierek and DiMatteo, 2009) and is estimated in the United States to cause 125,000 deaths, $100 billion in additional health care costs per year, and 19% of all hospital admissions (Hausman, 2004). Therefore, understanding and improving compliance can lead to better patient health outcomes and lower costs of health care.

Patient Trust in Physician

While many issues affect PPI, the central one is patient trust in the physician (Erdem and Harrison-Walker, 2006). From a health information perspective, patients report they trust their physician more than any other health care information source, including IHI (Iverson, Howard and Penney, 2008). Trust in the physician is

important due to the complexities of health issues, and this trust can help individuals when dealing with health related anxiety (Andreassen, Trondsen, Kummervold, Gammon and Hjortdahl, 2006). Trust is not something that can be achieved and then considered a given, but rather it must be nurtured by the physician through interactions with the patient (Andreassen, et al., 2006). This has led to a three stage model of physician patient trust, proposed by Dibben and Lean (2003). In this model a patient has a level of dispositional trust, or the "psychological trait to be trusting" (Dibben and Lean, 2003, p. 243), which dominates the early part of the relationship. Each appointment the patient has with a physician leads to individual situational trust based on that appointment with their physician. The collective experiences of each of these situational encounters sum to the learnt trust that the patient has with their physician, which in turn feeds into each subsequent physician encounter and can impact the situational trust developed in the next physician appointment (Dibben and Lean, 2003). This view of trust is consistent with Zahedi and Song's (2008) view of the gradual nature of trust building whereby "trust has been recognized to be dynamic and continuous" (Zahedi and Song, 2008, p. 228).

Internet Health Information

From a patient perspective, the effects of IHI have been perceived to be both positive and negative. From a positive standpoint, the most commonly cited effect is patient empowerment, with Broom (2005) indicating IHI can provide a sense of empowerment, purpose and control and patient empowerment can lead to better treatment and higher levels of patient satisfaction. Another important patient benefit from IHI is that it allows patient control over their rate of learning, thus reducing information overload often experienced in a physician's office (Iverson, et al., 2008). Other positive effects of IHI are enhanced patient confidence in dealing with physicians, better health choices and decision making, improved understanding of health conditions, and improved communication with physicians (Anderson, Rainey and Eysenbach, 2003; Murray, Lo, Pollack, Donelan, Catania, White, Zapert and Turner, 2003). Studies have shown that the majority (i.e., 72%) of IHI seekers indicate trust in the information they find online (Erdem and Harrison-Walker, 2006).

From a negative standpoint, the major issue regarding IHI is patient concern about physician disapproval. Patients worry that this disapproval can lead to physician hostility, irritation and lower quality of care and thus patient anxiety, confusion and frustration (Broom, 2005). Additional negative issues cited by patients include unnecessary visits to physicians, other patients taking too much of their physician's time discussing IHI, and an overall feeling that IHI could interfere with PPI (Murray, et al., 2003).

Principal-Agent Theory and Information Asymmetry

Principal-agent theory "aims to explain transactional arrangements between self-interested parties with incongruent goals in the presence of uncertainty" (Pavlou, Liang and Xue, 2007, p. 106). In this theory, the principal 'hires' the agent who performs some task on behalf of the principal, due to the fact that the principal typically has less information than the agent (i.e., information asymmetry). This theory has been applied in areas such as economics, buyer-seller relationships (Pavlou, et al., 2007) and employer/employee relations. Previous research has applied principal-agent theory to PPI (Vick and Scott, 1998; Xie, Dilts and Shor, 2006).

There are a number of reasons why it is our contention that principal-agent theory applies to PPI (specifically in the context of IHI), which are substantiated by a number of researchers. First, there is a recognized asymmetry of information in the PPI (Vick and Scott, 1998). This perceived imbalance of knowledge and power historically placed patients in a vulnerable position (Johnson and Ramaprasad, 2000) with the flow of information between patient and physician tenuous because of the knowledge/power gap (Johnson and Ramaprasad, 2000). However, the past decade (i.e., the IHI years) has fostered a challenge to this asymmetrical model of interaction where the physician held the majority of the information and power (Kaba and Sooriakumaran, 2007).

When the patient is empowered through their use of IHI, PPI "becomes an interaction between asymmetrically informed decision makers, each maximizing his or her respective utility" (Xie, et al., 2006). It is important for the physician to have information about the patient's utility function so that they can maximize both this utility and their own in the limited time they have during patient-physician encounters (Vick and Scott, 1998). However, physicians may "exploit their agency relationship with the patient when subject to incentives that diverge from the sole concern of maximizing patient well-being" (Xie, et al., 2006). This exploitation, while inconsistent with the basic philosophies of medicine (i.e., the Hippocratic Oath), may nonetheless occur due to factors such as medical system budget cutbacks, etc.

RESEARCH MODEL

We propose the theoretical model shown in Figure 1 to examine the role of patients' trust in the physician and its impact on patients' compliance with their advice in the presence of IHI. While other factors may be involved in compliance, we focus only on factors that are related to IHI use and its impact on information asymmetry as antecedents to patient compliance. We note that several of the relationships in this model are exploratory in nature and therefore do not have support in the current literature as we point at appropriate points below.

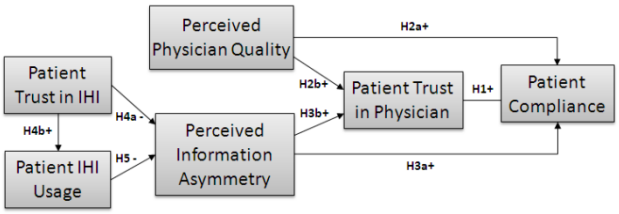

Figure 1 – Research Model

Compliance

Compliance is defined as "the extent to which the patient's behavior matches the prescribers recommendations" (Horne, et al., 2005, p. 33). Previous studies have shown that patients' self-reports of compliance generally concord with objective measures of compliance (Horne, et al., 2005), and therefore we will use self-reported measures of compliance in this research.

Patient Trust in Physician (PTP)

We adopt a traditional definition of trust, specifically "the willingness to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control the other party" (Zhang, Galletta, Li and Sun, 2009). It is believed that the more patients trust their physician, the more likely they are to follow to the advice and treatment that is recommended. Previous studies have shown relationships between PTP and compliance (Piette, Heisler, Krein and Kerr, 2005). Therefore we hypothesize:

H1 – Patient Trust in Physician will have a positive relationship with Patient Compliance.

Perceived Physician Quality (PPQ)

This formative construct is defined by both technical elements (i.e., competence, knowledge) as well as interaction elements (i.e., listening skills, communication, participative decision making). Previous studies have shown support for the relationship between the different elements of PPQ and Compliance (Hausman, 2004; Zolnierek and DiMatteo, 2009) and PPQ and PTP (Thom, Hall and Pawlson, 2004). We believe that the higher the patient's perception of their physician's quality, the more likely they are to trust their physician, and the more likely they are to comply with the recommendations made by their physician. Therefore we hypothesize:

H2a – Perceived Physician Quality will have a positive relationship with Patient Compliance.

H2b – Perceived Physician Quality will have a positive relationship with Patient Trust in Physician.

Perceived Information Asymmetry (PIA)

For the purposes of this study, we have adapted the definition put forth by Pavlou et al. (2007), and define PIA as "the [patient's] perception that the [physician] has a greater quantity or quality of information [compared to themselves]" (Pavlou, et al., 2007, p. 112). There are no known previous studies with direct theoretical support for the hypothesized relations between PIA and PTP or PIA and Compliance. However, we believe it is logical to assume that patients who feel that their physician has more and/or better health related information than they do will be more likely to have a higher amount of trust in the physician (because they have less information, they therefore feel a need to trust the physician) and be more likely to adhere to the physician's recommendations (because they believe the physician has more knowledge and therefore feel compelled to follow the advice). Therefore we hypothesize:

H3a – Perceived Information Asymmetry will have a positive relationship with Patient Compliance.

H3b – Perceived Information Asymmetry will have a positive relationship with Patient Trust in Physician.

Patient Trust in IHI

Given the proliferation of health websites and IHI, it is important that patients develop trust in IHI if they are going to make use of it. However, trust in IHI does not guarantee the accuracy or relevance of the IHI that patients gather and use. In some ways, this is similar to trust in a physician, which does not guarantee the quality of the physician. There are no known studies which have empirically modeled Patient Trust in IHI and its relationships with PIA. However, it is reasonable to believe that a patient who trusts IHI will feel that they have increased the level of their health knowledge and that the differential between their level of knowledge and the physician's level of knowledge is reduced. On the other hand, Previous research has shown support for the relationship between trust and usage intention (Bhattacherjee, 2002; Kim, Shin and Lee, 2009). Therefore we hypothesize:

H4a – Patient Trust in IHI will have a negative relationship with Perceived Information Asymmetry.

H4b – Patient Trust in IHI will have a positive relationship with Patient IHI Usage.

Patient IHI Usage

As stated previously, patient use of IHI is becoming more common. As with Patient Trust in IHI, there are no known studies which have empirically modeled Patient IHI Usage and its relationship with PIA. However, it is reasonable to believe that the more a person uses IHI, the more health related information they will have, leading to their perception that the differential between their information level and the physician's information level is reduced. Therefore we hypothesize:

H5 – Patient IHI Usage has a negative relationship with Perceived Information Asymmetry.

RESEARCH METHODOLOGY

Participants in this study will be adults who have an ongoing relation with a family physician or a specialist physician and who have accessed IHI on multiple previous occasions. Our research will include a pilot survey which will be used to test and refine the measurement instruments. We estimate the pilot study will have a sample size of approximately 40 people. For

the main study, we propose a cross sectional survey that will assess Compliance and the relationships between its antecedent constructs (i.e., Patient Trust in Physician, Perceived Information Asymmetry, etc.) Full ethics approval will be secured prior to the initiation of the pilot study and the execution of the main study. Wherever possible, we will use previously validated instruments to measure constructs in the proposed model, as per guidelines set forth by Boudreau et al. (2001). Compliance will be measured using a five item, 5-point Likert scale from Hasuman (2004). Patient Trust in Physician will be measured using an eleven item, 5-point Likert scale from Thom et al. (1999). Perceived Information Asymmetry will be measured via an adapted three item, 5-point Likert scale from Pavlou et al. (2007). Perceived Physician Quality, which includes both technical and interaction elements will be measured via multiple adapted items from Jayanti and Whipple (2008) and Hausman (2004). Patient Trust in IHI and Patient IHI Usage will be measured via a three item and a four item 5-point Likert scales, respectively, drawn from the PEW Internet and American Life Project (Fox and Fallows, 2003; Fox and Rainie, 2010). In addition, demographic, socio-economic, health knowledge and health status data will be collected during the study.

Structural Equation Modeling (SEM), specifically Partial Least Squares (PLS) will be used to validate the proposed model, as it supports confirmatory and exploratory research as well as both reflective and formative constructs. Our model is considered formative, as "once a researcher identifies one or more constructs in the model as formative, the research model must now be considered formative" (Petter, Straub and Rai, 2007, p. 640). Recommended sample size when using PLS is determined by the larger of: (i) 10 times the largest number of paths leading to a construct or (ii) 10 times the largest number of items in any one construct (Chin, 1997). Given that the Patient Trust in Physician construct has 11 items, we require a minimum of 110 participants, and we will therefore strive to recruit 150 participants to accommodate for spoiled surveys, etc. For reflective and formative construct reliability and validity as well as content validity, we will utilize all appropriate measures and processes as per Garson (2010), Au et al. (2008) and Petter et al. (2007). Finally, in addition to collecting responses for our construct measures, we will also collect responses to open-ended questions relating to participant perceptions about Physician Trust, IHI and Compliance. Responses to these open-ended questions will be analyzed to strengthen our findings through triangulation as per Benbasat (1987). Post-hoc analyses such as an examination of alternative models (e.g., saturated model, etc.) will also be conducted.

POTENTIAL CONTRIBUTIONS AND LIMITATIONS

This study will contribute to academics, practitioners and society in a number of ways. First, for academics, to the best of our knowledge this is the first known study that attempts to empirically model the trust relationship between patients and physicians in the context of IHI. In addition, this study attempts to empirically apply principal-agent theory to patient-physician trust in the context of IHI, examining the antecedents of perceived information asymmetry (i.e., patient trust in and usage of IHI). From a practitioner (i.e., physician) perspective, results of this research will assist in building and improving trusting relationships with their patients, as well as gaining an understanding of how their patients' use of and trust in IHI affects the trust and interactions they have with them. Finally, from a societal (i.e., patient, government) perspective, results of this study can potentially assist in building 'healthier' medical systems by enhancing the role of patients in health care delivery, increasing the utilization of IHI and potentially decreasing health care costs.

As with any research study, there are limitations which must be noted and acknowledged. First, because this study will be completed in Canada, the generalizability of this study to other countries with different medical systems (e.g., fee based, private, etc.) may not be possible. Secondly, this is a controlled study. However, the use of actual patients who have an ongoing relationship with a physician and have reported using IHI should ensure the realism of this study and the validity of its results. Finally, our construct measures are being collected at one point in time, therefore common method variance/bias is possible. To mitigate this, we will perform all necessary validation methods required (i.e., (i) Harman's single-factor test; (ii) using PLS to assess common method bias as per Liang et al. (2007)), as well as using quantitative and qualitative data to provide richer understanding of the results.

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